

Meeting Multiple Challenges: Re-Rating W. A. Parish Unit 8

NOx and Performance Improvements at a 650 MW coal-fired electric generating unit



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Who Are Reliant Energy and Texas Genco?



- **Reliant Energy**
 - Top 10 Generator of Electricity in US
 - 21,000 megawatts
 - Operates in 13 states
 - Also provides support to Texas Genco
- **Texas Genco**
 - Former HL&P power plants
 - 14,400 megawatts total, 12,000 in Houston area
 - Created as result of Texas Electric Power Industry Restructuring
 - Subsidiary of CenterPoint Energy, Reliant to purchase in 2004

W. A. Parish Station Description

- **Located on a 4880 acre site near Thompsons, Tx**
- **Four gas-fired and four coal-fired steam generators, plus a 13 MW gas turbine generator. Total gross capacity of over 3800 MW (largest fossil plant in U.S.)**
- **Approximately 360 employees**

W. A. Parish Station



W. A. Parish Unit Information

Unit	MW	Year	Primary Fuel
1	185	1958	Gas
2	185	1958	Gas
3	290	1961	Gas
4	565	1968	Gas
5	690	1977	Coal
6	690	1978	Coal
7	590	1980	Coal
8	650	1982	Coal
GT	13	1967	Gas

- **Emission Control Equipment**
 - **Baghouse system for particulate control**
 - **Low sulfur coal plus flue gas desulfurization system (FGD)**
 - **Low NOx burner/overfire air system**
 - **Selective catalytic reduction (SCR) systems under construction**

What are the Challenges Facing W. A. Parish?

- **Houston-Galveston SIP**
 - Lowest Coal Unit NOx limits in nation
 - Cap-and-trade program
- **Restructured Texas Electric Market**

Why Re-rate?

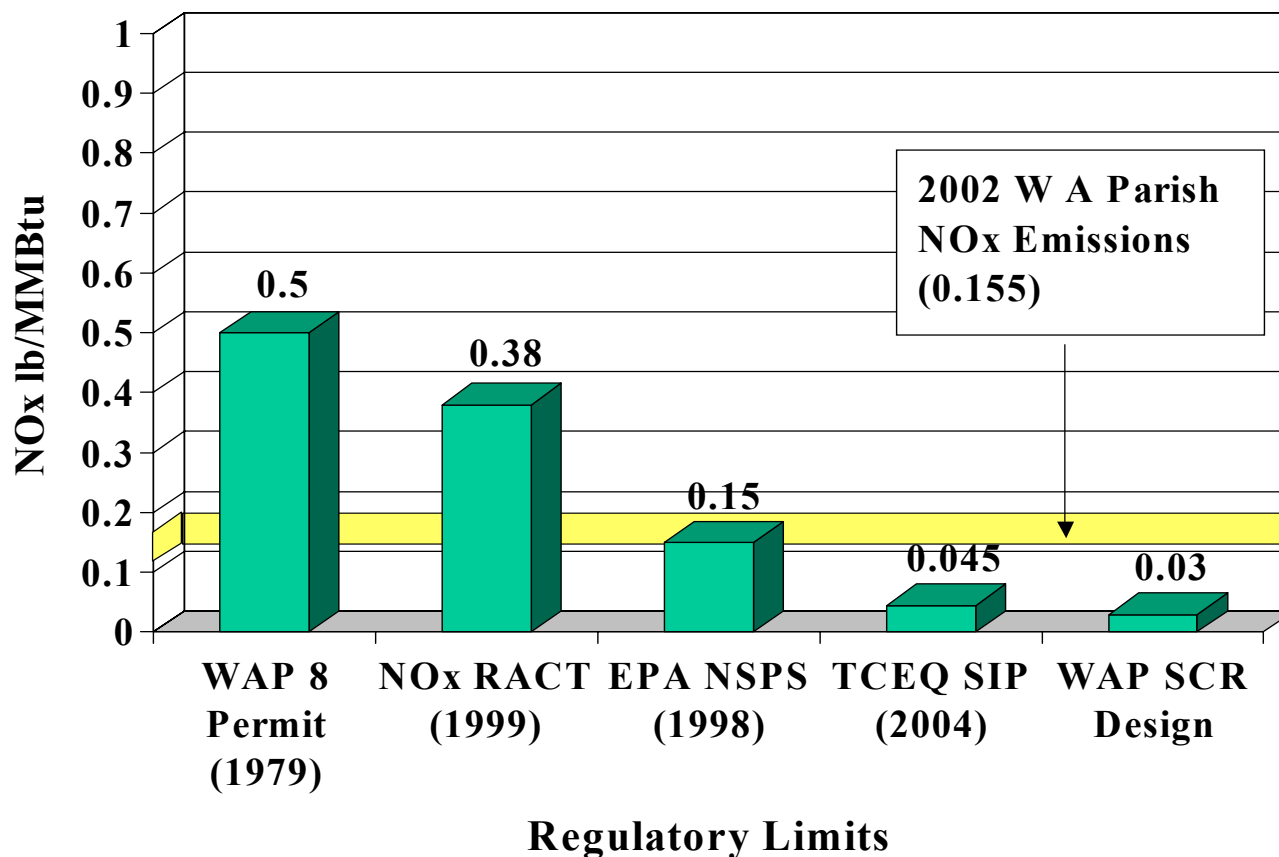
- **Restructured Texas Electric Market**
 - Economics based on production
 - Production dispatched based on lowest cost
 - W. A. Parish is low-cost power plant
- **New Opportunities**
 - Improved materials
 - Better efficiencies

Challenges to Re-rating or “Why doesn’t everyone?”

- **New Source Review**
 - BACT
 - More emission controls
 - Nonattainment NSR – LAER, offsets
- **The Steady Downward March of NOx**
 - NSPS, RACT, SIP Limits
 - Area-wide NOx reductions – 88% reduction by 2004
 - More emission controls
- » **Meeting Multiple Challenges - One stone, two birds**

The Steady Downward March of NO_x

W A Parish Coal Unit Regulatory NO_x Limits



Meeting Multiple Challenges – Re-rating Unit 8

- **Increase Production Capacity**
 - 10% Increase – from 590 to 650 MW
 - Improved efficiency
- **New Source Review**
 - No significant increase in NO_x, SO₂, or VOC due to emission controls – No NSR or NSPS
 - PSD for CO, PM₁₀, H₂SO₄ and Fluoride
 - Existing equipment determined to represent BACT
- **SIP Compliance**
 - SCR under construction
 - Operational by end of 2003
 - Lowest NO_x coal plant in country

W. A. Parish Emission Control Equipment

- **Baghouse systems for fly ash removal**
 - Utilize fiberglass bags to trap fly ash
 - >99.9% removal efficiency

**Unit 5 Baghouse
contains ~15,000 bags**



W. A. Parish Emission Control Equipment

- **Flue Gas desulfurization system (FGD) for SO₂ removal on Unit 8**
 - Spray tower design
 - Limestone slurry reagent
 - SO₂ removal of ~80%

Unit 8 FGD System



W. A. Parish Emission Control Equipment

- **NOx Reduction**
 - **Advanced LNB/OFA systems installed on all coal units**
 - 1st commercial installation of Alstom LNB/OFA system guaranteed to meet 0.15 lb/MMBtu
 - 50%-60% NOx reductions achieved

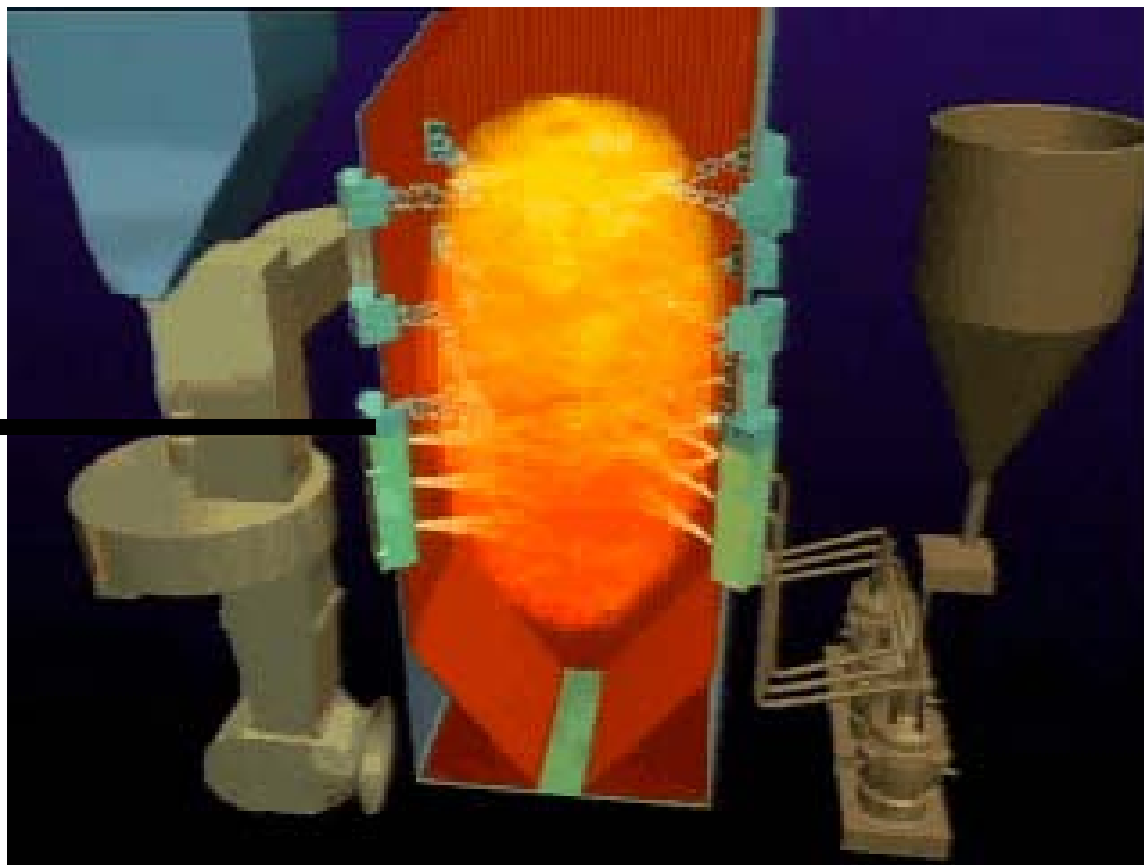


Low NOx design of the Unit 7 & 8 TFS 2000 System

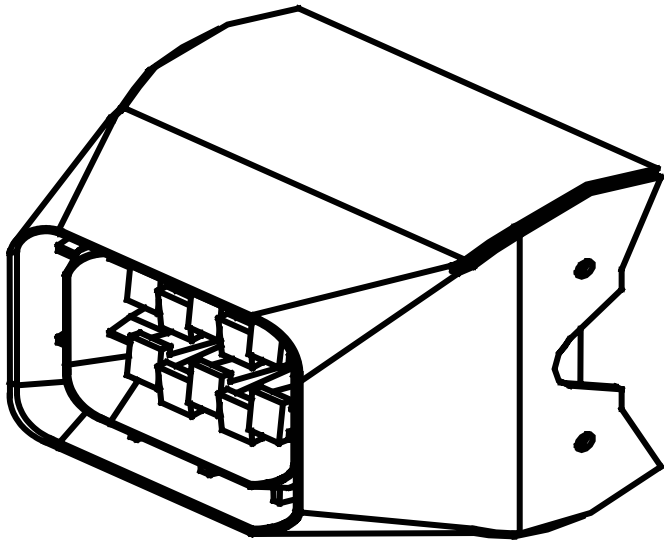
Air injected
in the
burnout zone



Fuel and air
injected in the
combustion
zone



P2tm Coal LNB Nozzle Tip



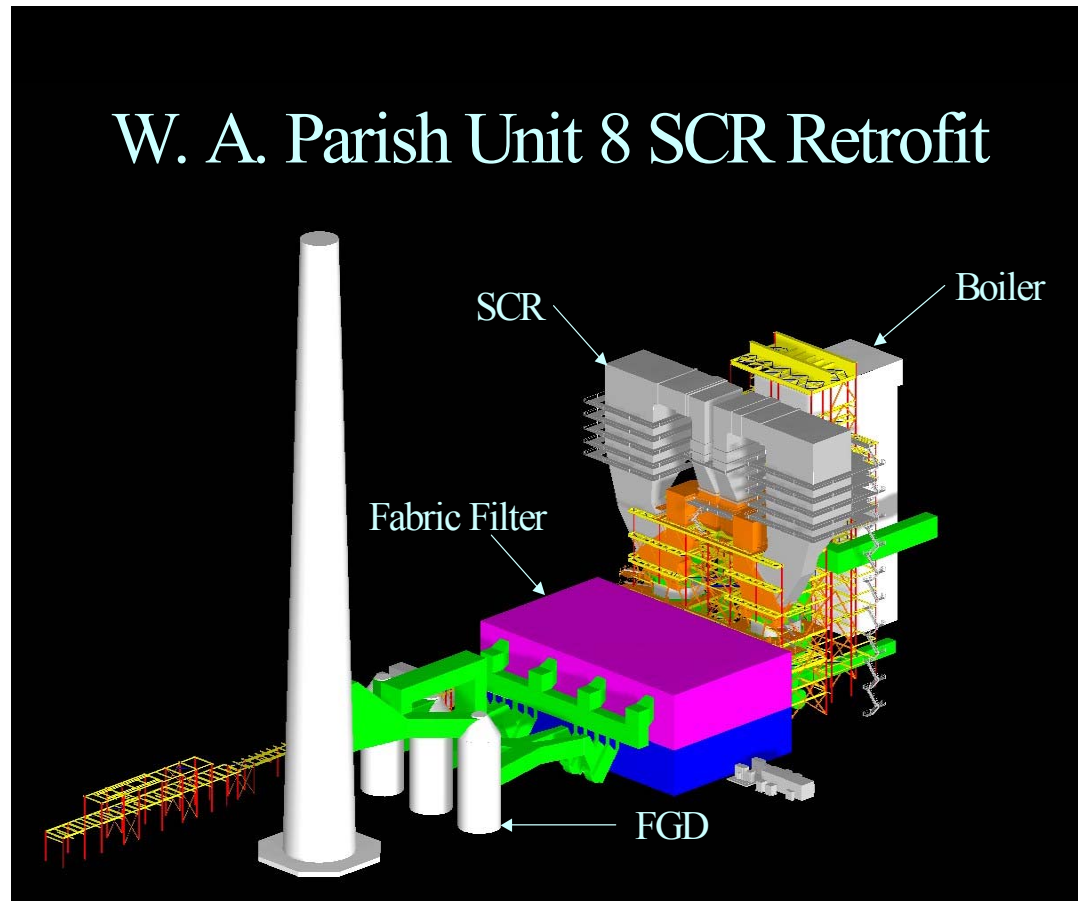
LNB Installation



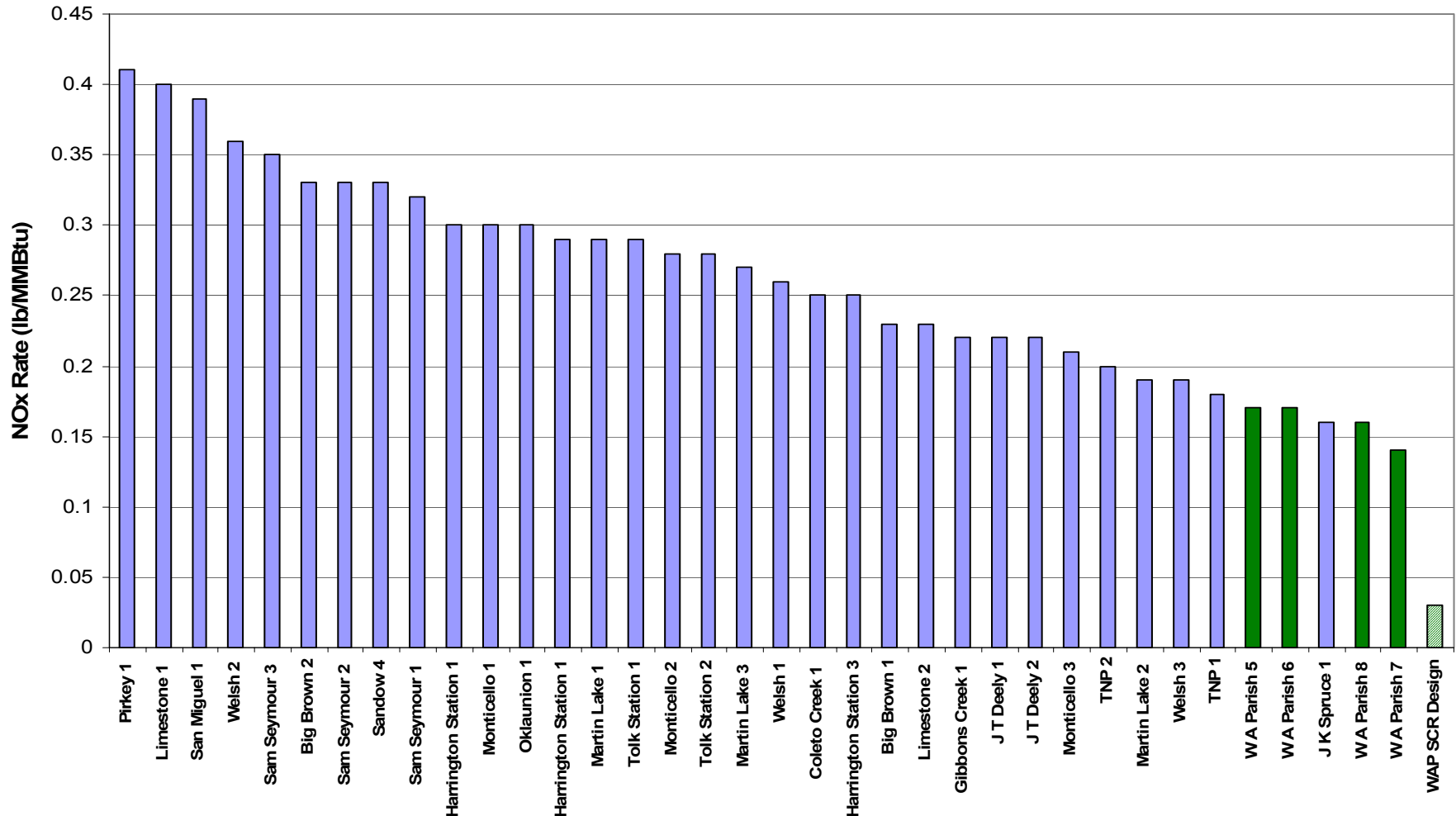
W. A. Parish Emission Control Equipment

Coal unit SCR's under construction

- Vanadium-titanium catalyst
- Aqueous NH₃ reagent
- 80-85% reduction to meet 0.03 lb/MMBtu



Texas Coal-fired Unit NOx Rates (2001)



W. A. Parish Unit 6 SCR Construction (May , 2000)



W. A. Parish Unit 6 SCR Construction (July, 2002)



W. A. Parish Unit 5 SCR Construction (July, 2002)



W.A.Parish Unit 8 SCR Construction (April, 2001)



W. A. Parish Unit 6 Catalyst Loading (July, 2002)



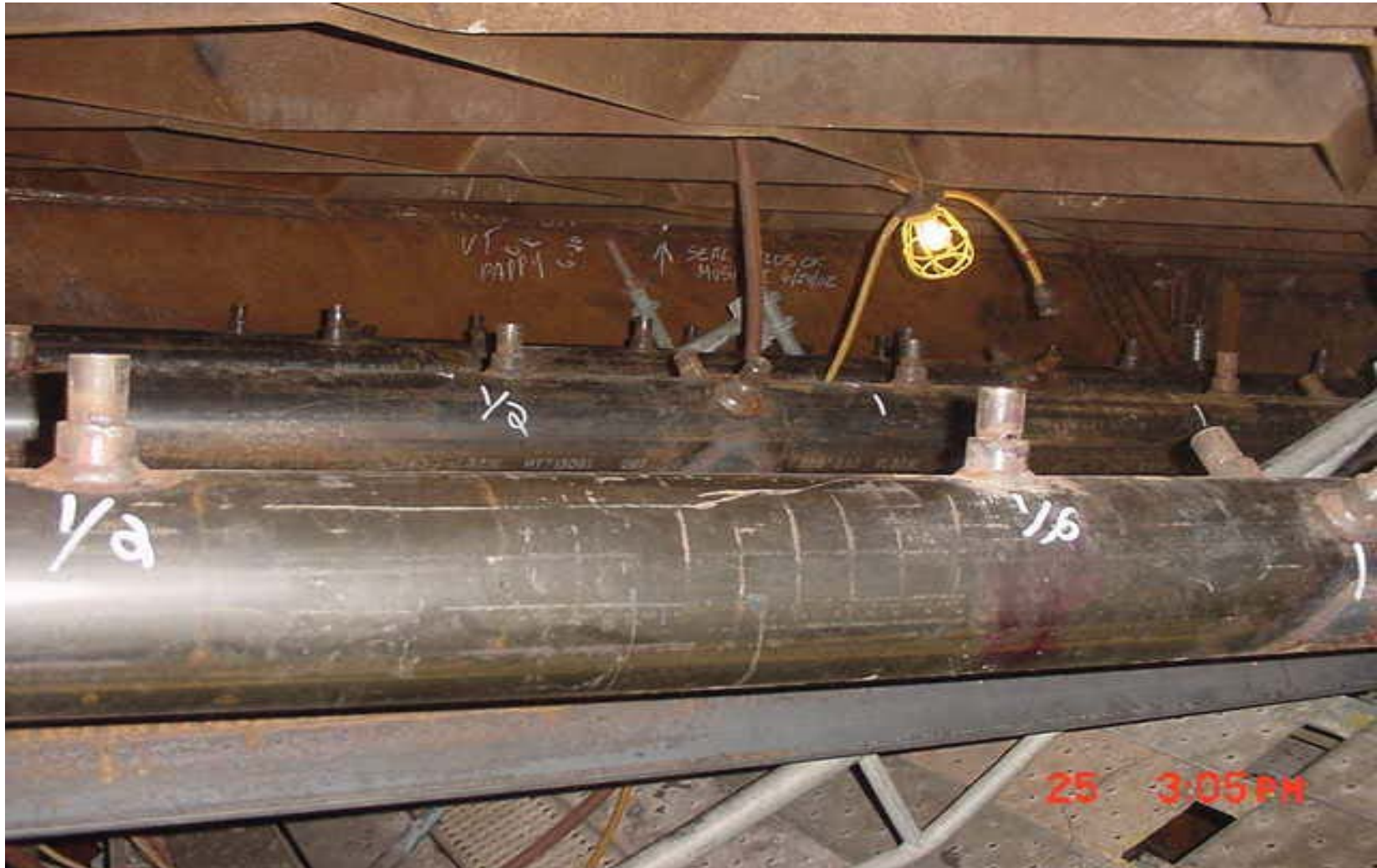
W. A. Parish Unit 6 Catalyst Loading



W. A. Parish Ammonia Tank Farm



W. A. Parish Unit 6 NH3 Injection Nozzles





Meeting Multiple Challenges – Review

- **Increased Production Capacity**
 - 10% Increase – from 590 to 650 MW
 - Improved efficiency
- **Reduced Emissions**
 - SCR under construction
 - Cleanest coal plant in country
 - NOx to 0.03 lb/mmBtu design value

Questions and Answers

